1. A method for forming a giant magnetoresistive (GMR) sensor element comprising:

providing a substrate;

forming over the substrate a seed layer, the seed layer being formed of a magnetoresistive (MR) resistivity sensitivity enhancing material selected from the group consisting of nickel-chromium alloys and nickel-iron-chromium alloys;

forming over the seed layer a nickel oxide material layer;

forming over the nickel oxide material layer a free ferromagnetic layer;

forming over the free ferromagnetic layer a non-magnetic conductor spacer layer;

forming over the non-magnetic conductor spacer layer a pinned ferromagnetic layer; and

forming over the pinned ferromagnetic layer a pinning material layer.

2. The method of claim 1 wherein the nickel oxide material layer provides an enhanced magnetoresistive (MR) resistivity sensitivity to the giant magnetoresistive (GMR) sensor element.

~~3~~ 2. The method of claim 1 wherein the giant magnetoresistive (GMR) sensor element is selected from the group consisting of simple spin valve magnetoresistive (SVMR) sensor elements, synthetic antiferromagnetically biased giant magnetoresistive (GMR) sensor elements, simple spin filter giant magnetoresistive (GMR) sensor elements and spin filter synthetic antiferromagnetically biased giant magnetoresistive (GMR) sensor elements.

4. The method of claim 1 wherein the nickel oxide material layer is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.

~~5~~ 4. The method of claim 1 wherein the free ferromagnetic material layer and the pinned ferromagnetic material layer are each formed of a ferromagnetic material selected from the group consisting of nickel, iron and cobalt ferromagnetic materials, alloys thereof, laminates thereof and

laminates of alloys thereof.

6. A giant magnetoresistive (GMR) sensor element comprising:

a substrate;

a seed layer formed over the substrate, the seed layer being formed of a magnetoresistive (MR) resistivity sensitivity enhancing material selected from the group consisting of nickel-chromium alloys and nickel-iron-chromium alloys;

Sub A3

a nickel oxide material layer formed over the seed layer;

a free ferromagnetic layer formed over the nickel oxide material layer;

a non-magnetic conductor spacer layer formed over the free ferromagnetic layer;

a pinned ferromagnetic layer formed over the non-magnetic conductor spacer layer; and

a pinning material layer formed over the pinned ferromagnetic layer.

6 ~~7~~. The giant magnetoresistive (GMR) sensor element of claim 5 ~~6~~ wherein the giant magnetoresistive (GMR) sensor element is selected from the group consisting of simple spin valve magnetoresistive (SVMR) sensor elements, synthetic antiferromagnetically biased giant magnetoresistive (GMR) sensor elements, simple spin filter giant magnetoresistive (GMR) sensor elements and spin filter synthetic antiferromagnetically biased giant magnetoresistive (GMR) sensor elements.

Sub A4

~~8. The giant magnetoresistive (GMR) sensor element of claim 6 wherein the nickel oxide material layer is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.~~

8 ~~9~~. The giant magnetoresistive (GMR) sensor element of claim 5 ~~6~~ wherein the free ferromagnetic material layer and the pinned ferromagnetic material layer are each formed of a ferromagnetic

material selected from the group consisting of nickel, iron and cobalt ferromagnetic materials, alloys thereof, laminates thereof and laminates of alloys thereof.

9
~~10~~. A magnetoresistive (MR) head having incorporated therein a giant magnetoresistive (GMR) sensor element in accord with claim ~~6~~ 5.

10
~~11~~. The magnetoresistive (MR) head of claim ~~10~~ 9 wherein the magnetoresistive (MR) head is selected from the group consisting of magnetoresistive (MR) read only magnetic heads, merged inductive write magnetoresistive (MR) read magnetic heads and non-merged inductive write magnetoresistive (MR) read magnetic heads.

11
~~12~~. A magnetic data storage enclosure having incorporated therein a magnetoresistive (MR) head in accord with claim ~~10~~ 9.

13. A method for forming a spin valve magnetoresistive (SVMR) sensor element comprising:

providing a substrate;

forming over the substrate a seed layer, the seed layer being formed of a magnetoresistive (MR) resistivity sensitivity enhancing material selected from the group consisting of nickel-chromium alloys and nickel-iron-chromium alloys;

forming upon the seed layer a nickel oxide material layer;

forming upon the nickel oxide material layer a free ferromagnetic layer;

forming upon the free ferromagnetic layer a non-magnetic conductor spacer layer;

forming upon the non-magnetic conductor spacer layer a pinned ferromagnetic layer; and

forming upon the pinned ferromagnetic layer a pinning material layer.

14. The method of claim 13 wherein the nickel oxide material layer provides an enhanced

30

magnetoresistive (MR) resistivity sensitivity to the spin valve magnetoresistive (SVMR) sensor element.

15. The method of claim 13 wherein the nickel oxide material layer is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.

~~16.~~ 14 The method of claim ~~13~~ 12 wherein the free ferromagnetic layer and the pinned ferromagnetic layer are each formed of a ferromagnetic material selected from the group consisting of nickel, iron and cobalt ferromagnetic materials, alloys thereof, laminates thereof and laminates of alloys thereof.

17. A spin valve magnetoresistive (SVMR) sensor element comprising:

a substrate;

a seed layer formed over the substrate, the seed layer being formed of a magnetoresistive (MR) resistivity sensitivity enhancing material selected from the group consisting of nickel-chromium alloys and nickel-iron-chromium alloys;

a nickel oxide material layer formed upon the seed layer;

a free ferromagnetic layer formed upon the nickel oxide material layer;

a non-magnetic conductor spacer layer formed upon the free ferromagnetic layer;

a pinned ferromagnetic layer formed upon the non-magnetic conductor spacer layer; and

a pinning material layer formed upon the pinned ferromagnetic layer.

18. The spin-valve magnetoresistive (SVMR) sensor element of claim 17 wherein the nickel oxide material layer is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.

17 ~~19~~. The spin-valve magnetoresistive (SVMR) sensor element of claim ~~17~~ 15 wherein the free ferromagnetic layer and the pinned ferromagnetic layer are each formed of a ferromagnetic material selected from the group consisting of nickel, iron and cobalt ferromagnetic materials, alloys thereof, laminates thereof and laminates of alloys thereof.

18 ~~20~~. A magnetoresistive (MR) head having incorporated therein a spin-valve magnetoresistive (SVMR) sensor element in accord with claim ~~17~~ 15.

19 ~~21~~. The magnetoresistive (MR) head of claim ~~20~~ 18 wherein the magnetoresistive (MR) head is selected from the group consisting of magnetoresistive (MR) read only magnetic heads, merged inductive write magnetoresistive (MR) read magnetic heads and non-merged inductive write magnetoresistive (MR) read magnetic heads.

20 ~~22~~. A magnetic data storage enclosure having incorporated therein a magnetoresistive (MR) head in accord with claim ~~20~~ 18.